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# THE BRYOLOGIST.

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## FURTHER NOTES ON CLADONIAS. VII.

### ***Cladonia subcariosa*, *Cladonia mitrula* and *Cladonia leptophylla*.**

BRUCE FINK.

Perhaps the first of our three species to be considered in this paper might better have been disposed of in the last paper of this series with *Cladonia cariosa*, to which species it is closely related. It certainly would seem that *Cladonia mitrula*, a very characteristic and common American species, should have first place in the considerations of the present paper; and this species must be regarded as the central and important feature, the other two species as yet being very rare North American forms. However, in spite of its relative unimportance to the student of our Cladonias, *Cladonia subcariosa*, because of its closer relation to the species considered in the last paper, is entitled to first place in the caption, and in the considerations to follow.

CLADONIA SUBCARIOSA (Nyl) Wainio Mon. Clad. Univ. 2:38. 1904. Primary thallus persistent or rarely disappearing, composed of subdichotomously divided, irregularly lacinate or crenate sinuate, flat, ascending or suberect, aggregated squamules, which are large or medium sized, 3-17 mm. long and nearly as wide, sea-green above or varying toward ashy or olivaceous, below whitish or finally dirty-brownish especially toward the base, the cortex continuous and no soredia present. Podetia arising from the margin, or rarely from the upper surface of the squamules, about 5-15 mm. long (rarely 30 mm.) and .5-4 mm. in diameter, subcylindrical or thickened toward the top, cupless and always terminated by apothecia, simple or rarely furcate and often very shortly digitate, sides entire, finally fissured or rarely conspicuously rimose, the axils likewise usually closed or at length fissured, clustered or scattered, suberect or rarely ascending, cortex subcontinuous or areolate, the areoles when present subcontinuous or quite close and scarcely elevated or elevated wart-like, without squamules or soredia or rarely sparsely squamulose, dull sea-green varying toward olivaceous or greenish, or the decorticate portions pale or whitish. Apothecia usually medium sized, .5-4 mm. in diameter, clustered-conglomerate, often somewhat lobed at the apex of the podetia or on their short branches, soon becoming convex and immarginate, brown or perhaps rarely varying toward reddish. Hypothecium pale, Hymenium brownish above and pale or brownish below. Paraphyses simple or rarely branched toward the thickened and brownish apex. Asci clavate or cylindrico-clavate.

This species may best be known from *Cladonia cariosa* by the larger squamules and by their shorter, unbranched or slightly branched podetia, which show a less marked carious appearance and less commonly and conspicuously

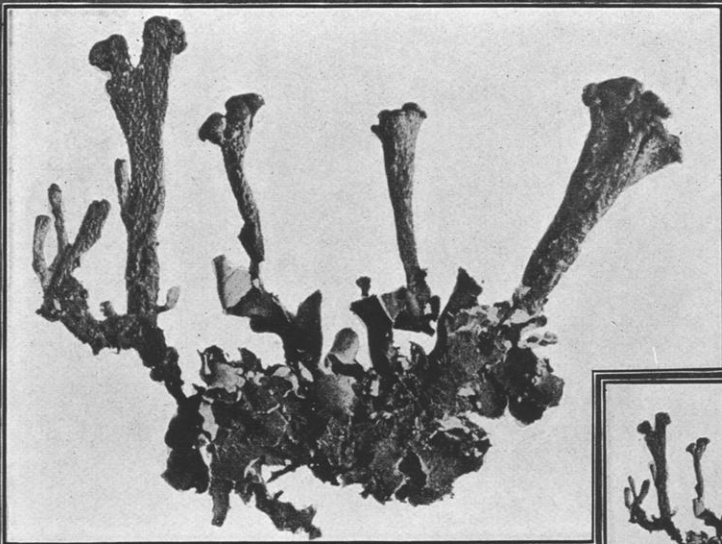


FIG.1.A.

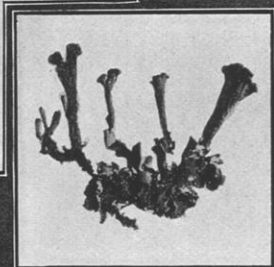


FIG.1.B.

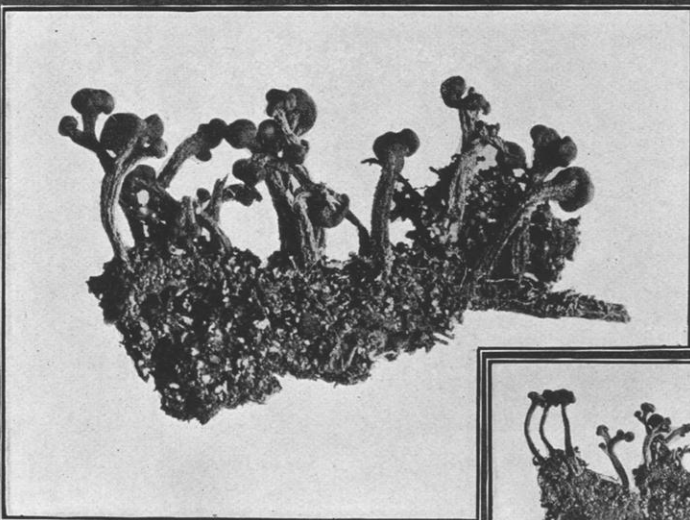


FIG.2.A



FIG.2.B.

PLATE IV. Fig. 1. *Cladonia subcariosa*, a.  $\times 3$ . b. Nat. size.  
 Fig. 2. *Cladonia mitrula*, a.  $\times 3$ . b. Nat. size.

fissured sides and axils. The present species also bears a strong resemblance to the next below, from which it may be distinguished by the larger squamules and by the stouter, more nearly continuously corticate and sometimes more loosely apically branched, lighter colored podetia. Reference was made in the last paper to specimens called *Cladonia symphy carpia* Fr., by American workers, and referred to *Cladonia cariosa* by Dr. Wainio, to whom the material was submitted by the present writer. However, some of these specimens with large or very large and much cut squamules, Dr. Wainio referred to *Cladonia subcariosa*, and this, in one or two instances, with few podetia, thus depending mainly upon the squamules, which in these specimens, at least, are very markedly different from those of *Cladonia cariosa*. By way of illustration of the squamules of the present species we give a few of these squamules from the plant noted below and collected in the Lookout Mountains by W. W. Calkins (his No. 85 of "North American Lichens") and distributed by him as *Cladonia symphy carpia* Fr. For the podetia we give illustration from a few separated from cespitose clusters as exhibited in a specimen in the writer's herbarium, collected in Germany by Dr. F. Arnold, in 1897, which illustrates the podetia much better than any American material at hand (Plate IV. fig. 1, b).

On earth, especially on sand in open places. Determined by Dr. Wainio from the writer's herbarium as follows: Tacoma Park, D. C. (collected Mabel E. Williams), and distributed in "Lichenes Boreali-Americani" (No. 178) as *Cladonia symphy carpia*, and Lookout Mountains, collected by W. W. Calkins, who distributed it in his "North American Lichens (Nos. 85 and 94) as *Cladonia symphy carpia*. As for further North American distribution, Dr. Wainio adds Massachusetts, Texas and some adjacent islands. Known in all grand divisions.

CLADONIA MITRULA Tuck. in Darl. Fl. Cestr. 444. 1853. Primary thallus commonly persistent, composed of subdichotomous, irregularly or subdigitately lacinate or crenate, flatish, ascending or suberect, clustered, small or middling sized squamules, which are 1.5-4 mm. in length and nearly or quite as wide, ashy to sea-green above and whitish below. Podetia arising from the margin or from the surface of the squamules, 3-12 mm. long and .4-1.6 mm. in diameter, cylindrical and cupless, always terminated by apothecia, simple or branched toward the apex, the branches erect or spreading, sometimes fissured longitudinally, the axils sometimes open, clustered or subsolitary, erect, cortex continuous or composed of contiguous or subcontiguous areoles, or rarely partly decorticate and somewhat sorediate, sometimes sparingly squamulose, ashy to sea-green or the decorticate portions whitish. Apothecia small or middling sized, 1-2 mm. in diameter, solitary or clustered, sometimes perforate, at first flat and marginate but usually becoming convex and immarginate, brown varying toward paler or reddish-brown. Hypothecium pale or brownish. Hymenium pale or brownish below, and brownish above. Paraphyses usually simple, commonly thickened and brownish toward the apex. Asi clavate (Plate IV. Fig. 2, a, b.).

On naked earth, frequently sandy soil, or rarely on old tree trunks in

more shaded places. Distributed throughout the United States, especially southward, being replaced largely northward by *Cladonia cariosa* (see last paper), but reported as far north as Alaska ("Lichens of Alaska," by, Clara E. Cummings). Examined by the writer from Massachusetts (Clara E. Cummings and Henry Willey), Maryland (T. A. Williams,) North Carolina (C. Russell), South Carolina (H. A. Greene), Lookout Mountains in Tennessee (W. W. Calkins, who distributed it as *Cladonia cariosa*), Florida (W. W. Calkins), Louisiana (A. B. Langlois), Ohio (E. E. Bogue), Illinois (G. P. Clinton, W. W. Calkins and Bruce Fink), Iowa and Minnesota (Bruce Fink), Missouri (C. Russell and B. F. Bush), Nebraska (T. A. Williams), and British America (J. Macoun). Dr. Wainio's Monograph would add Texas, New Jersey, New England, Pennsylvania and Mexico. Known also in South America.

Dr. Wainio calls the typical form on earth *Cladonia mitrula imbricata* (Nyl) Wainio, and says the form on trees in somewhat open places is *Cladonia mitrula abbreviata* Wainio Mon. Clad. Univ. 2:16. 1894. The last he cites from Brazil, and distinguishes it by smaller podetia, which are only .5-5 mm. long and .3-.5 mm. in diameter. We may well look for this diminutive form in our territory.

H. A. Green's specimen from South Carolina, referred to *Cladonia cariosa*, is perhaps nearer the present species.

CLADONIA LEPTOPHYLLA (Ach.) Flk. Clad. Comm. 19. 1828. Primary thallus commonly persistent, composed of subrotund, entire, crenate or rarely incised, flat or more or less convex, appressed or ascending, clustered squamules, which are .5-2 mm. in length and width, whitish or pale sea-green above and pale below. Podetia arising from the surface of the primary thallus, 2-9 mm. long and 1-2 mm. in diameter, subcylindrical, cupless, always terminated by apothecia, simple or rarely fastigiate branched and the branches suberect, the sides commonly more or less open, the axils sometimes fissured, clustered or scattered, erect, commonly decorticate and more or less finely soresdiate, rarely more or less squamulose, whitish or pale sea-green. Apothecia small or middling sized, 1-3 mm. in diameter, subsolitary at the apices of the podetia or on the branches, commonly convex and immarginate, brown or pale reddish brown. Hypothecium pale or pale-brownish. Hymenium pale or pale-brownish below and brownish above. Paraphyses commonly simple and frequently thickened and brownish toward the apex. Asci clavate or cylindrico-clavate.

This species is by no means easily distinguished from the last from any description. But the squamules are only about half as large, are not so irregular in form and are never suberect, being flat or ascending. The podetia are on the whole shorter and thicker, and more inclined to ecorticate and soresdiate conditions. The first material sent to Europe by the present writer was sent to L. Scriba, who sent part of it to Dr. Wainio. It was sent as *Cladonia mitrula*, to which Scriba agreed, Wainio calling it *Cladonia leptophylla*. The writer afterward submitted again to Dr. Wainio material from a packet, which Mr. Scriba had returned to him with some European cladonias, the packet being part of the material originally sent to Scriba, collected all in

one cluster on a clay bank. Dr. Wainio this time called the material *Cladonia mitrula*. This statement is submitted primarily to show that the species is difficult to distinguish and that the Iowa material is not certain, and in no sense to cast reproach on the work of any other lichenist. It is only those of very limited experience in taxonomic work, or who have very poor powers of observation, who suppose that a really good worker may not sometimes make different diagnosis of material that is intermediate between two species, the difference being due rarely to incomplete consideration of every diagnostic character, and no doubt more often to the fact that material from the same *Cladonia* cluster may often show a considerable amount of variation.

Material from Battle Lake and Leaf Hills, in Minnesota, collected by the present writer, is like the Iowa material, which is in turn doubtful. Henry Willey reported the species in his "New Bedford Lichens," but Dr. Wainio seems not to have known of this material. Dr. Wainio cites a single American specimen in his Monograph. This is cited doubtfully from Carolina. Thus there is room for doubt as to whether this species has really been found in America. The plant occurs on soil, especially clay, and is known in Europe and Asia. Grinnell, Iowa.

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### MOUNTING MOSSES—SOME HINTS.

J. FRANKLIN COLLINS.

In the September, 1903, issue of this journal Mr. Chamberlain described the method which was employed a few years ago to fasten moss envelopes to herbarium sheets in the Brown University Herbarium. It may be of interest to readers of THE BRYOLOGIST to learn of the method which has superseded it. The latter method has been used more than two years in the University Herbarium, as well as in my own private one. Gummed wafers are utilized instead of pins. The particular wafers which we use are made of a half-inch circle of white paper, well gummed on both sides. They may be obtained for a few cents a thousand from almost any stationer. To use them to the best advantage a single wafer is grasped by the edge, with slender pointed forceps, and moistened on both sides. It is then thrust between the envelope and mounting paper, the former having been placed in the proper position on the latter before the wafer is moistened. A firm finger-pressure for one or two seconds over the wafer is sufficient to cause it to adhere securely. The forceps points are withdrawn as soon as the pressure with the finger is applied. Unless the envelope is a large one a single wafer is generally sufficient.

In case the envelope has to be transferred to another sheet it is instantly removed by one sweep of a paper knife, or other blunt-edged instrument, beneath the envelope. The wafer usually splits, leaving part on the sheet and part on the envelope. This slight disfigurement of the sheet, which is often soon covered by another envelope, may be regarded by some as an objection to the use of the wafers. This disfigurement only occurs, however, when